

(b) sending electronic offer messages generated by the intermediary computer program to the computer programs representing the participants, wherein each of the electronic offer messages provides a proposed exchange of commodities offered by the intermediary computer program in accordance with objectives of the intermediated exchange;

(c) receiving by the intermediary computer program electronic counter-offer messages generated by the computer programs representing the participants, wherein each of the electronic counter-offer messages provides responses to the proposed exchange of commodities offered by the intermediary computer program, and wherein each of the counter-offer messages are generated in accordance with objectives of the associated participants for exchange of commodities.

(d) repeating steps (b) and (c), if necessary, until an exchange of commodities is substantially satisfactory according to the objectives of the participants and according to the objectives of the intermediated exchange.

86/ 87. (New) The method of claim 86, wherein the objectives of the intermediated exchange reflect the interests of the plurality of the participants.

89/ 88. (New) The method of claim 86 further comprising sending from the intermediary computer program to the programs of the participants a plurality of electronic initial messages, each of the electronic initial messages including digital data representing commodities that can be exchanged in the intermediated exchange.

90/ 89. (New) The method of claim 86 further comprising the intermediary computer program receiving and storing electronic objective messages from an operator of the electronic intermediated exchange, each of the electronic objective

message including digital data representing the objectives of said intermediated exchange.

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90. (New) The method of claim 86, wherein the intermediary computer program is based on a parameterized utility function with constraints that reflect the interests of the plurality of the participants.

92
91. (New) A computer readable medium comprising encoded instructions for causing an electronic computer to function according to claim 86.

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92. (New) A computer system for electronic intermediated exchange of a plurality of commodities among a plurality of participants comprising an electronic intermediary computer program running on at least one computer, wherein said intermediary computer program stores in an associated electronic memory digital data representing commodity exchange objectives of the intermediated exchange, said intermediary computer program comprising software for receiving electronic opening messages from computer programs representing the participants, wherein the opening messages provide exchange requests of the participants to the intermediated exchange; software for generating and sending electronic initial offer messages to the computer programs representing the participants, wherein the electronic offer messages provide a proposed exchange of commodities offered by the intermediary computer program based on the commodity exchange objectives of the intermediated exchange; software for receiving electronic counter-offer messages generated by the computer programs of the participants, wherein the electronic counter-offer messages provide responses to the proposed exchange of commodities offered by the intermediary computer programs and wherein the counter-offer messages have been generated in accordance with objectives of the associated participants for exchange of commodities; and software for generating subsequent offer messages so as to cause an exchange of

commodities which is substantially satisfactory in accordance with both objectives of the participants, and also with the objectives of the intermediated exchange.

93. (New) The computer system of claim 92 wherein the electronic offer messages include digital data representing amounts of commodities that the intermediary computer program offers to the computer programs representing the participants, and wherein the electronic counter-offer messages include digital data representing the amounts of commodities that the computer programs representing the participants accept from said intermediary computer program.

94. (New) The computer system of claim 92 wherein exchange of electronic messages between the intermediary computer program and computer programs representing the participants terminates when counter-offer messages accept all the terms offered in the immediately preceding electronic offer messages received from the intermediary computer program.

95. (New) The computer system of claim 92 wherein the electronic memory associated with the intermediary computer program further stores digital data representing a plurality of bounds on selling or buying of each commodity by each of the computer programs representing the participants, and wherein the commodity exchange objectives of the intermediary computer program include substantially maximizing amount of commodities exchanged in the intermediated exchange subject to constraints (i) that for each commodity the total amount sold equals the total amount bought by all computer programs representing the participants, and (ii) that for each commodity the amount sold or bought by each computer program representing the participants is less than the appropriate one of the bounds.

96. (New) The computer system of claim 95 wherein the commodity exchange objectives of the intermediary computer program further comprise that a

measure of the unfairness of the share of commodities offered to each computer program representing the participants is substantially minimized.

96/97. (New) The computer system of claim 96 wherein the measure of unfairness increases substantially as the share of commodities offered to each computer program representing the participants differs from a pro-rata share.

99/98. (New) The computer system of claim 92 wherein the electronic offer messages (including the subsequent offer messages) include digital data representing amounts of commodities offered to the computer programs representing the participants, and wherein the intermediary computer program generates the commodity amounts for the electronic offer messages by substantially maximizing the value of a utility function of the amounts of commodities subject to constraints.

100/99. (New) The computer system of claim 98 wherein the utility function comprises a difference of a first term and a second term, the first term representing the total amount of all commodities offered to the computer programs of the participants and the second term representing the unfairness of the share of commodities offered to the computer programs of the participants.

101/100. (New) The computer system of claim 92 wherein the electronic counter-offer messages include digital data representing amounts of the commodities that the computer programs representing the participants accept from the intermediary computer program.

102/101. (New) A computer implement method for representing a participant in an intermediated exchange of commodities, wherein the intermediated exchange is performed by an electronic negotiation with an intermediary computer program comprising:

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sending an electronic opening message to the intermediated exchange computer, wherein the electronic opening message includes digital data representing a requested exchange of the participant;

receiving an electronic offer message from an intermediary computer program, wherein the electronic offer message includes digital data representing an exchange proposed by the intermediary computer program; and

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sending an electronic counter-offer message in response to the electronic offer message to the intermediary computer program, wherein the electronic counter-offer message includes digital data representing exchange terms accepted by the computer program representing the participant as determined according to exchange objectives of the participant.

SUB C3 / 102 (New) The method of claim 101 wherein the exchange objectives of the participant are expressed as procedural rules which determine accepted amounts of commodities from offered amounts of commodities.

103 (New) The method of claim 101 wherein the exchange objectives are expressed according to mean-variance portfolio theory.

104 (New) The method of claim 103 wherein the exchange objectives are expressed as utility function of commodity amounts, and wherein accepted commodity amounts substantially maximize the utility function subject to maximum amount constraints given by the offered commodity amounts.

105 (New) A computer readable medium comprising encoded instructions for causing an electronic computer to function according to claim 62.